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I N S E C T P E S T S U R V E Y B U L L E T I N

Vol. 19

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DISTRIBUTION AND FOOD PLANT RECORDS OF Paratetranychus citri McG.,
P. ilicis McG., P. pilosus C. & F., Tetranychus pacificus McG.,
and T. telarius L.

By Janet E. Mabry and Mary M. Walton

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INTRODUCTION

The following data have been compiled during the routine work of the Insect Pest Survey and to meet special requests for survey information. As all of the mites discussed are of economic importance, it is believed that a compilation of such data will be of value to workers in applied entomology. Any additions or corrections will be gladly accepted.

The names of counties are underscored, the word "county" being left out, and the names of foreign countries and provinces are written in all capital letters.

Paratetranychus citri McG.

Distribution in the United States

Alabama: In the Satsuma orange districts of southern Alabama and neighboring Gulf States.

California: Los Angeles, Claremont in eastern part of the county, San Fernando, San Fernando Valley; Orange, La Habra-Whittier area; Riverside, Riverside; Santa Barbara; San Bernardino, Upland-Cucamonga, Upland-Ontario district, Upland; San Diego, Chula Vista, Escondido, Lemon Grove, Rancho Santa Fe, San Diego; San Gabriel Valley; San Luis Obispo, San Luis Obispo; Ventura, Santa Paula. Note: "Has been observed in every citrus area in southern California." —E. A. McGregor.

Florida: Orange, Orlando. Infestation heavy over most of the State. Noted in the Peninsula in the western and southern parts.

Louisiana: Several heavy infestations have been found in the citrus-growing section.

Mississippi: Jackson, Ocean Springs; Lamar, Lumberton; Lowndes, Columbus.

Texas: Rio Grande Valley; southeastern Texas.

Foreign Distribution:

South America: BRAZIL, Minas Geraes; Vicosa.^{1/} BERMUDA, CUBA. HAWAII:^{2/} Present in every part of the Territory. Noted from Captain Cook to Napoopoo; Honolulu. JAPAN. NEW ZEALAND.

Host Plants

Amygdalus persica, Brassica sp., Choisya sp., Citrus grandis, Citrus limonia; Citrus nobilis var. unshiu, Citrus sinensis, Citrus trifoliata, Cucurbita pepo; Cytisus scoparius, Dahlia sp., Echinocystis macrocarpa, Ipomoea purpurea, Juglans regia, Malus sylvestris, Malva parviflora; Rosa sp., Solanum sp., Taraxacum sp., Urtica urens.

Paratetranychus ilicis McG.

Distribution in the United States

Alabama: Colbert, Spring Hill; Mobile, Mobile.

District of Columbia: Washington, Spring Valley.

California: Alameda, Berkeley; Contra Costa, south of Walnut Creek, San Ramon; Cucamonga, San Bernardino; Los Angeles, Inglewood, Los Angeles, Puente, San Fernando Valley, Whittier; Monterey, Gonzales, King City; Orange, Anaheim, Fullerton, Santa Ana; San Luis Obispo, Arroyo Grande, San Luis Obispo; Santa Barbara, Santa Barbara, Santa Maria; Santa Clara, Palo Alto, San Jose; Stanislaus, Turlock; Ventura, Santa Paula, Ventura.

Georgia: Spalding, Experiment, Griffin.

Michigan: Berrien; Kent; Van Buren; southwestern Michigan.

Ohio: Lake, Painesville.

South Carolina.

Virginia: Princess Anne, Cape Henry.

^{1/} There are two such places in Brazil. It is not known which one the reporter referred to.

^{2/} Biologically speaking, Hawaii is foreign.

Host Plants

Azalea indica, Camellia japonica, Cinnamomum camphora, Cornus florida, Cotoneaster sp., Cupressus sp., Cydonia sp., Eriobotrya japonica, Eucalyptus sp., Eucalyptus globulus, Ilex opaca, Juglans sp., Juglans regia, Photinia arbutifolia, Platanus occidentalis, Pyracantha coccinea, Pyracantha unanensis, Pyrus sp., Quercus nigra, Quercus phellos, Quercus virginiana, Quercus wislizensii, Rubus strigosus, Sonchus arvensis, Tsuga sp.

Paratetranychus pilosus C. & F.

Distribution in the United States

This species is somewhat general along the Atlantic coast from Nova Scotia to Virginia and west to Ontario, Michigan, and southern Indiana. It is found in the West from British Columbia south to central and southern California and east to southern Idaho and northern Utah.

California: Alameda, Oakland; Los Angeles, Hollywood, Los Angeles, North Whittier Heights, Venice, Whittier; Orange, Yorba Linda; San Joaquin, San Joaquin Valley; San Luis Obispo; Santa Barbara; Santa Clara; Tulare, Tulare; Ventura, Ventura; Yolo.

Connecticut: Fairfield, Danbury, Fairfield, Georgetown, Greenwich, New Canaan, Stamford, Wilton; Hartford, Bristol, Farmington, Glastonbury, Hartford, Southington, Unionville; Litchfield, Bantam; Middlesex, Branford, Cheshire, Clintonville, Guilford, Hamden, Madison, Milford, Mount Carmel, New Haven, North Branford, North Haven, Wallingford, Woodbridge; New London; Tolland, Storrs.

Delaware: Kent, Camden; New Castle, Newark; Sussex.

District of Columbia: Washington, east Potomac Park.

Idaho: Ada, Boise; Canyon; Cassia; Franklin; Gem; Gooding; Nez Perce, Lewiston; Oneida; Payette; Teton; Twin Falls, Twin Falls; Washington.

Illinois: Livingston.

Indiana: Knox, Vincennes; Marion, Indianapolis; Orange, Orleans.

Maine: Kennebec, Augusta; Oxford.

Maryland: Allegany, Cumberland, Lonaconing, Oldtown; Carolina, Denton; Harford, Havre de Grace; Prince Georges, Branchville, College Park; Talbot, Easton; Worcester, Berlin.

Massachusetts: Bristol; Connecticut Valley; Essex, Marblehead, West Newbury; Hampshire, Amherst; Middlesex, Lincoln; Norfolk, Atlantic; Plymouth, East Wareham, Brockton; Worcester, Harvard.

Michigan: Clinton, Saint Johns, near Fowler and Ovid; Ingham, East Lansing; Muskegon, Muskegon; Oakland, Birmingham, Novi, Rochester; Washtenaw.

Minnesota: Winona.

New Hampshire: Hillsboro, Wilton; Rockingham, Hampton Falls; Stafford, Durham.

New Jersey: Atlantic; Bergen; Burlington, Bridgeboro; Camden; Cape May; Cumberland; Essex; Gloucester; Hudson, south Jersey; Hunterdon; Mercer; Middlesex, New Brunswick; Monmouth, Manasquan; Morris; Salem; Sussex.

New York: Albany, Ravena; Broome, Binghamton; Cayuga; Chautauqua; Clinton; Columbia; Dutchess; Erie; Essex; Genesee; Green; Hudson Valley; Kings, Brooklyn; Monroe; Nassau; Niagara; Onondaga, Syracuse; Ontario, Geneva; Orange; Orleans; Oswego; Rensselaer; Rockland, Spring Valley; Saratoga; Schuyler; Seneca; Suffolk; Tompkins, Ithaca; Ulster; Wayne; Yates.

North Carolina: Haywood, Waynesville; Mitchell, Altapass; Watauga, Blowing Rock.

Ohio: Ashtabula; Clark, New Carlisle; Cuyahoga, Cleveland, subdivision of Bratenahl; Delaware; Erie, Sandusky; Fairfield; Franklin, Columbus; Huron, Norwalk; Lake, Willoughby; Lorain, Elyria; Lucas, Toledo, Waterville; Mahoning, Youngstown; Montgomery, Erie-Chautauqua; Ottawa, Catawba Island, Port Clinton; Sandusky, Clyde, Fremont; Trumbull, Hubbard; Wayne, Wooster.

Oregon: Benton, Corvallis.

Pennsylvania: Adams, Arendtsville; Centre, State College; Chester; Dauphin; Delaware; Luzerne; Lycoming; Montgomery, near Norristown; York, Delta.

Rhode Island: Noted in the State by A. E. Stene in 1924.

Utah: Cache, Logan, Providence; Davis; Salt Lake, Magna; Utah.

Vermont: Addison; Bennington, Dorset; Chittenden; Grand Isle; Orange, Bradford; Topsham; Rutland, Castleton; Washington, Waitsfield; Windham; Windsor.

Virginia: Augusta, Waynesboro; Fairfax, Oakton; Frederick.

Washington: Okanogan, Oroville; Walla Walla, Walla Walla Valley; Yakima, Yakima Valley.

West Virginia: Greenbrier, Lewisburg; Hampshire, Levels; Monongalia, Morgantown.

Wisconsin: Sauk.

Foreign Distribution

Canada: BRITISH COLUMBIA, Fraser Valley, Agassiz district; Yale, Kelowna, Okanagan, Summerland, Vernon. NOVA SCOTIA, Digby, Annapolis-Kings, Annapolis

Royal, Morden, Wolfville; Halifax, Halifax; Kings; Annapolis Valley. NEW BRUNSWICK, Kent; Royal, Westfield; St. John-Albert, St. John River Valley; Victoria-Carleton, Coldstream; York-Sanbury, Fredericton, Sheffield, ON-TARIO, Durham; Essex; Hastings; Trenton; Lambton, Forest; Lincoln, Vine-land; Niagara Peninsula; Welland, Fonthill; Wellington, Guelph to Fonthill Prairies Provinces: ALBERTA, MONTREAL, SASKATCHEWAN, QUEBEC.

Europe: BELGIUM. CZECHOSLOVAKIA. DENMARK. ENGLAND, Berks, Twyford; Berkshire Buckingham; Cheshire; Cornwall; Devon, Brixham, Devon; Dorset, Gillingham; Gloucester, Bristol, Cambridge; Kent, East Malling, Marden; Lancashire, Preston; Monmouth, Monmouth; Norfolk; Northumberland, Rochester; Stafford, Stafford; Surrey, Wisely; Warwick, Stratford-on-Avon; Yorks, Bingley, Bishopthorpe. FINLAND, Helsinki. FRANCE. GERMANY, Lower Elbe; Alte Land district. HOLLAND, Zeeland. IRELAND, Dublin. ITALY. NORWAY. RUSSIA, Transcaucasus. SWEDEN. SWITZERLAND. WALES, North Wales; Mid-Wales; South Wales.

BERMUDA. JAPAN, Tokyo. AUSTRALIA, Tasmania. NEW ZEALAND, Palmerston North; Tiritea.

Host Plants

Acer sp., Amygdalus communis, Amygdalus persica, Amygdalus persica nectarina, Buxus sp., Crataegus sp., Ficus sp., Juglans regia, Magnolia sp., Malus sylvestris, Medicago sativa, Phlox sp., Pinus sp., Pittosporum sp., Prunus armeniaca, Prunus avium, Prunus cerasus, Prunus domestica, Prunus salicina, Pyrus communis, Quercus sp., Ribes vulgare, Rosa sp., Rubus strigosus, Salix sp., Sorbus sp., Thea sp., Tilia sp., Ulmus sp., Vitis sp., Zinnia sp.

Tetranychus pacificus McG.

Distribution in the United States

The Pacific red spider occurs from Portland, Oreg. to Delano, Calif., and probably farther south. Note: "I have observed this mite at many localities in the three Pacific coast States." - E. A. McGregor.

California: Fresno; Kern, Bakersfield, Delano; Los Angeles, Covina, Puente; Riverside, Riverside; Sacramento, lower Sacramento Valley, Sacramento Valley; San Joaquin, Acampo, Linden, Lodi, Manteca, San Joaquin Valley, Stockton; Stanislaus; Tulare; Tuolumne, Mt. Diablo, Stanislaus National Forest; Yolo, Knights Landing.

Idaho: Canyon, Parma; Cassia; Franklin; Nez Perce, Lewiston district; Oneida; Teton; Payette district; southwestern Idaho; southern part of State; northern part of State.

Oregon: Jackson, Talent; Multnomah, Portland; Portland to Delano, Calif.

Washington: Chelan, Azwell, Wenatchee Valley; Okanogan, Omak; Yakima, Grandview, Yakima Valley.

Host Plants

Amygdalus persica, Apium graveolens, Asclepias sp., Capsella bursapastoris, Castanea sp., Citrullus vulgaris, Citrus grandis, Cucurbita sp., Cucurbita maxima, Ficus sp., Gramineae, Ipomoea sp., Juglans sp., Juglans nigra, Malus sylvestris, Malus sp., Medicago sativa, Melia azedarach, Phaseolus sp., Philadelphus gordoni, Anus, Platanus racemosa, Prunus domestica, Prunus virginiana, Pyrus sp., Quercus sp., Ribes sp., Robinia sp., Rubus parviflorus, Rubus sp., Rumex sp., Salix sp., Solanum melongena, Vicia sp., Vitis sp., Viburnum sp.

Tetranychus telarius L.

This mite is nearly world wide in distribution. According to H. E. Ewing "T. telarius is a serious pest in Europe and is generally distributed, except in the northern part of Russia and in the Scandinavian Peninsula. In North America it is found from Ontario to Texas and from British Columbia to southern California. It is also known from South America, Hawaii, South Africa, and Australia. There appear to be no records of its occurrence in India, or in the Philippines. (Jour. Ent. and Zool. Claremont, Calif., v. 6, No. 3, pp. 121-132, September 1914.) Other authors, however, report it from India.

Ewing considers T. telarius L., T. bimaculatus Harv., and T. gloveri Banks as synonymous. (Oreg. Agr. Expt. Sta. Bul. 121, 95 pp., August 1914; The Common Red Spider or Spider Mite, Rev. Appl. Ent. (A), v. 3, p. 63, 1915.) He no longer considers T. sexmaculatus Riley as a variety of T. telarius, but now regards it as a distinct species. He says, "The name T. bimaculatus Harv. cannot be used for this mite. The proper scientific name for it dates back many years before the days of Harvey. First a few years ago went over the matter again and decided upon T. telarius L. as the scientific name for the common spider mite of North America and Europe, which are without doubt identical. The question of a variational form does not apply in this case as has been claimed by some." (U. S. Natl. Mus. Let. Dec. 1, 1933.)

E. A. McGregor differs from the views of Ewing as to the synonymy of T. telarius L. He treats T. gloveri Banks as a synonym of T. bimaculatus. He says it is doubtful whether the true T. telarius occurs in North America at all. (The Red Spiders of America and a Few European Species Likely to be Introduced, U. S. Natl. Mus. Proc., v. 56, pp. 641-679, 1919.)

Throughout most of the volumes of the Review of Applied Entomology, T. telarius and T. althaea are considered identical, but althaea has at times been separated under the following genera: Epitetranychus, Paratetranychus, and Tetranychus.

This report includes records available in the Insect Pest Survey files and in the literature for T. telarius, T. bimaculatus and T. althaea (Epitetranychus) (Paratetranychus), and T. gloveri.

E. A. McGregor, after reviewing this manuscript, made the following statements regarding T. telarius L. and its synonymy: "On a few occasions I have received identified material from Europe and it may be stated that T. telarius (as determined by Zacher) is entirely distinct from the common American 'red spider,' going under that name. Speaking of the 'red spider' of linden trees in Europe,

Zacher says, 'This is the original species of red spider, which in 1766 was described as Acarus telarius by Linne and later, in the year 1832, was referred to the genus Tetranychus on account of the structure of the tarsus * * *. The linden mite is the smallest of the true Tetranychus species * * * red-colored individual are rarely seen. The form designated as T. telarius by Ewing, Hirst, and others, I hold to be T. althaeae von H.' Personally, I agree with Zacher in his conception of telarius. Like him, I believe that if our common 'red spider' of the United States is identical with an European species it is T. althaeae. The male genital characters of the latter agree quite well with those of our mite. Other characters of telarius as described by Zacher differ materially from those of the common American mite."

Distribution in the United States

Alabama: Baldwin, Fairhope; Barbour, Clayton; Chambers, Lafayette; Clark, Grove Hill; Coffee, Enterprise; Colbert, Tuscaloosa; Elmore, Deatsville; Houston, Dothan; Lamar, Millport; Lawrence, Moulton; Lee, Auburn; Marshall, Guntersville; Montgomery, Montgomery; Perry, Marion; Pike, Troy; Tuscaloosa, Tuscaloosa; Walker, Carbon Hill.

Arizona: Cochise, Cochise; Maricopa, Mesa, Phoenix; Salt River Valley.

Arkansas: Craighead; Crittenden; Cross; eastern counties; Faulkner; Lee; Miller; Mississippi; Monroe; northeastern Arkansas throughout the Delta; Phillips, Helena; Poinsett; Saint Francis.

California: Butte, Biggs, Chico; Calaveras; Colusa; Arbuckle; Fresno; Glenn; Kern, Bakersfield north to upper Sacramento Valley; Lake; Los Angeles, Chatsworth, Downey, Hawthorne, Inglewood, Los Angeles to Cucamonga, Montebello, Pomona, Rivera, San Fernando Valley, San Fernando, San Gabriel, Venice, Whittier; Madera; Merced; Orange; Riverside, Hemet, Riverside; Sacramento, Perkins, San Bernardino, Cucamonga, Redlands; San Diego, Chula Vista; Santa Clara, Mountain View; San Joquin, San Joaquin Valley; San Luis Obispo; Shasta; Sutter; Tulare, Tulare, Visalia; Ventura; Yolo; Yuba, Wheatland. On walnut trees in all parts of the State.

Colorado: Arapahoe, Littleton; Arkansas Valley; Delta; Denver, Denver; eastern Colorado; Larimer, Fort Collins; Mesa, Grand Junction, Palisade; Montrose; northern Colorado; western Slope.

Connecticut: New Haven, Branford, Madison, North Haven.

Delaware: Sussex, Bridgeville, Nassau.

District of Columbia: Washington (greenhouse in 6th wing of U. S. Dept. Agr. Bldg.).

Florida: Alachua, Gainesville, La Crosse; Bradford, Starke; Charlotte, Punta Gorda; Dade, Miami; Duval, St. Nicholas; Jackson, Malone; Jefferson, Monticello; Lake, Eustis, Groveland, Leesburg, Yalaha; Madison, Madison; Monroe, Key Largo; Orange, Orlando; Polk, Galloway; Seminole, Sanford; Volusia, Pierson.

Georgia: Berrien; central Georgia; Cook; Decatur, Bainbridge; Echols, Statenville; Franklin, Royerton; Hart; Johnson, Wrightsville; Löndes, Valdosta; McIntosh; Macon, Marshallville; Madison; northern Georgia; Peach, Fort Valley; Richmond, Augusta; Spalding, Experiment, Griffin; Tift, Tifton; western mid-State section.

Idaho: Note from R. W. Haegeler: "In the Insect Pest Survey Bulletin dated August 1, 1937 (v. 17, No. 6, p. 284), is a report I sent in regarding the common red spider, or the two-spotted mite. This note refers to both apple and prune. This fall I collected specimens of this mite from apple and sent them to E. A. McGregor for determination. He writes me that the mite is T. pacificus McG. This has been one of our common mite pests in the past and we have always called it the common red spider, or two-spotted mite. T. telarius L. may or may not occur here." Before this identification was made T. telarius was reported as generally distributed in all orchards of the State. (See E. A. McGregor's distribution map in U. S. Dept. Agr. Farmers' Bul. 831, p. 5, 1917.).

Illinois: Adams, Ursula; Alexander, Cairo; Bond; Carroll, Savanna; central Illinois; Champaign, Urbana; Clark; Cook, Chicago; Du Page, Lisle; Fulton, Canton; Grundy; Kane, Big Rock, Elgin; Kankakee; Knox, Galesburg; Lake, Libertyville; La Salle, Mendota; Lee, Paw Paw; Livingston; McLean, Bellflower; Ogle, Oregon, Rochelle; Scott, Winchester; Shelby, Strasburg; Saint Clair, Belleville; Tazewell, Pekin; Vermilion, Danville; White, Carmi; Will, Lockport.

Indiana: Boone, Jamestown, Lebanon, Thorntown; central Indiana; Clinton, Frankfort; Dearborn, Aurora; De Kalb, Garrett; Delaware, Muncie; Dubois, Jasper; Elkhart, Elkhart; Fayette, Connersville; Floyd, New Albany; Franklin, Cedar Grove; Grant, Marion; Jackson, Brownstown; Jefferson, Hanover; Johnson, Greenwood; Knox, Vincennes; Kosciusko, Sidney, Warsaw; Lake, Hobart; La Porte, Michigan City; Madison, Anderson, Elwood, Orestes; Marion, Indianapolis; Marshall, Argos, Plymouth; Monroe, Bloomington; Montgomery, Linden; northern half of State; Ohio, Rising Sun; Porter, Valparaiso; Posey, Mount Vernon; Pulaski, Winamac; Putnam, Greencastle; Scott, Scottsburg; Shelby, Shelbyville; southwestern Indiana; Starke, North Judson; Steuben, Angola; Sullivan, Carlisle, Sullivan; Tippecanoe, La Fayette; Tipton, Goldsmith; Vanderburgh, Evansville; Vermilion, Clinton; Wabash, Wabash; Wayne, Dublin, Richmond.

Iowa: Southern Iowa.

Kansas: Arkansas River Valley district; Barber, Kiowa; Butler, Douglas; Clay, Wakefield; Comanche, Wilmore; Cowley; Crawford, Pittsburg; eastern half of State; Ford, Dodge City; Graham, Hill City; Gray, Ingalls; Harper, Anthony Harvey; Jackson; Kiowa; Logan, Monument; Kow Valley; Leavenworth, Leavenworth; Marion, Tampa; Marshall, Blue Rapids; Neosho; northeastern Kansas; Pratt, Pratt; Reno, Haven, Hutchinson; Riley, Manhattan; Russell, Russell; Sedgewick; Sumner, Belle Plaine, Oxford; Washington, Clifton; Wilmore.

Kentucky: Bell, Pineville; the bluegrass region; Fayette, Lexington; Jefferson, Louisville; Perry, Hazard.

Louisiana: East Baton Rouge, Baton Rouge, University; East Louisiana; Livingston, Springfield; Madison, Tallulah; Orleans, New Orleans; Tangipahoa, Hammond, Ponchatoula.

Maine: Penobscot, Orono; southern Maine.

Maryland: Allegany; Anne Arundel; Baltimore, Towson; Caroline; Eastern Shore; Harford, Havre de Grace; Kent, Chestertown; Montgomery; Prince Georges, Beltsville; Somerset, Marion; Talbot, Easton; Washington; Wicomico; Worcester, Pocomoke, Showell.

Massachusetts: Bristol, Mansfield; eastern Massachusetts; Hampshire, Amherst; Middlesex, Arlington, Watertown, Woburn; Suffolk, market-garden district around Boston; Worcester, west Auburn.

Michigan: Berrien, Saint Joseph, Stevensville; Calhoun, Albion; Cass, Cassopolis; Hillsdale, Jonesville; Ingham, Lansing; Jackson, Jackson; Kent, Grand Rapids; Lenawee, Adrian; Macomb, Mount Clemens; Monroe, Monroe; Oakland, Farmington; Van Buren, Paw Paw, South Haven; Wayne, Detroit.

Minnesota: Jackson; throughout the State.

Mississippi: Adams, Natchez, Washington; Adams and adjoining counties; Alcorn, Corinth; Amite; Benton, Hickory Flats, Michigan City; Bolivar, Boyle, Cleveland, Pace, Rosedale, Scott; Calhoun, Calhoun City, Vardaman; Carroll, Carrollton; Chickasaw, Buena Vista, Houston; Choctaw, Ackerman; Claiborne, Hermanville; Clarke, Quitman; Clay, West Point; Coahoma, Clarksdale, Hillhouse, Lula; Copiah, Crystal Spring; Covington; Forrest, Hattiesburg; George, Lucedale; Greene, Leakeville, Vernal; Grenada, Grenada; Hancock, Bay Saint Louis; Harrison, Biloxi, Gulfport, Long Beach; Hinds, Bolton, Edwards, Raymond; Holmes, Cruger, Durant, Lexington, Tchula; Humphreys, Belzoni, Louise, Midnight; Issaquena; Itawamba; Jackson, Ocean Springs, Pascagoula, Pecan; Jasper, Moss Point; Jefferson, Fayette; Jefferson Davis, Prentiss; Jones, Laurel, Moselle; Kemper; Lafayette, Oxford; Lauderdale, Meridian; Lawrence; Lee, Baldwyn, Guntown, Tupelo; Leflore, Minter City, Greenwood; Lincoln, Brookhaven; Lowndes, Caledonia, Columbus; Madison, Canton; Marshall, Byhalia, Holly Springs, Hudsonville, Potts Camp; Monroe, Aberdeen, Amory, Prairie, Smithville; Montgomery, Winona; Neshoba, Philadelphia; Newton, Union; Noxubee, Brookville, Shuqualak; Oktibbeha; Panola, Sardis; Pike, Magnolia, McComb; Pontotoc, Pontotoc; Prentiss, Booneville; Quitman, Marks; Scott; Sharkey, Catchings, Rolling Fork; Simpson; Smith; Stone, Perkinston, Perry, Wiggins; Sunflower, Baltzer, Blaine, Doddsdale, Drew, Inverness, Sunflower; Tallahatchie, Charleston; Tate, Senatobia; Tishomingo, Iuka; Tunica, Maud, Tunica; Union, Ingomar, New Albany; Washington, Greenville, Hollandale, Stoneville; Wayne; Webster, Manatee; Wilkinson, Centreville; Winston, Louisville; Yalobusha, Coffeeville Water Valley; Yazoo, Bentonia, Yazoo City.

Missouri: Atchison, Rockport; Buchanan, Saint Joseph; Franklin, Gerald; Jackson, Independence, Kansas City; Mississippi, Charleston; Nodaway, Maryville; northwestern Missouri; Pemiscot, Caruthersville; Ray, Hardin; Ripley, Doniphan; Saint Louis, Shaw Gardens, Saint Louis; Shelby, Clarence; southeastern Missouri; southwestern Missouri.

Montana: Beaverhead, Wisdom; Gascoda, Great Falls; Fergus, Moore; Flathead, Somers; Gallatin, Bozeman; Lake, Flathead; Lincoln, Fortine; Ravalli, Altamont.

Nebraska: Adams; Antelope; Buffalo; Cass; Chase; Cheyenne; Clay; Cuming; Custer, Antelope Valley; Dawes; Dawson; Dodge; Douglas, west to Nance, north to Cumings, and south to Johnson Counties; Dundy; eastern counties; Gage; Garfield; Hamilton; Hays; Kellogg; Lancaster, Lincoln; Morrill; Nance; Nuckolls; Otoe; Pawnee; Perkins; Phelps; Platte; Red Willow; Saline; Seward; Sheridan; Sioux; Thayer; Valley; Wayne; Webster; western Nebraska.

Nevada: Mineral, Mina; Washoe, Reno.

New Hampshire: No specific records.

New Jersey: Middlesex, Monmouth Junction; throughout the State.

New Mexico: Torrance, Estacia Valley; Valencia.

New York: Albany, Albany; Broome, Deposit; Delaware; Cattaraugus, Delevan; Chautauqua; Columbia; Dutchess; Erie, Brant, Buffalo, North Collins; Erie; Jefferson, Adams; Kings, Brooklyn; Monroe, Highland Park, Rochester; Nassau, Glen Cove, Hempstead, Manhasset, Old Westbury; New York, New York City; Niagara; northwestern New York, Genesee Valley; Oneida, Utica; On-tario; Orleans; Queens, Springfield Gardens; Rockland; Suffolk, Bellport, Riverhead; Tompkins, Ithaca; Ulster, Kingston; Wayne; western New York.

North Carolina: Alamance, Alamance; Anson; Beaufort, Martin; Bertie; Bladen, Dublin; Brunswick; Buncombe, Grantville; Burke; Cabarrus, Cabarrus; Caldwell, Lenoir; Carteret; Columbus, Chadbourn; Craven, Warren; Cumberland, Cumberland; Durham, Durham; Gaston, Stanley; Granville, Catham; Guilford, Guilford; Halifax, Halifax; Harnett, Harnett; Hertford, Union; Hoke; Iredell; Johnston; Lee; Lincoln; Macon, Franklin; McDowell, Pitts; Mecklenburg, Davidson; Mitchell, Vance; Montgomery; Moore; Nash; New Hanover, Wilmington; Northampton; Pender, Edgecombe; Perquimans, Hertford; Pitt; Randolph; Polk, Columbus; Robeson; Rockingham, Leadsville; Rowan, Cleveland, Rowan; Sampson, Orange; Scotland; Wake; Washington, Hoke; Wayne; Wilson.

North Dakota: Kidder, Steele; counties along the Red River Valley.

Ohio: Allen, Elida, Lima; Ashland, Ashland; Ashtabula, Ashtabula; central Ohio; Clark, New Carlisle, Springfield; Cuyahoga, Cleveland, Dover, Rocky River; Eric, Milan; Fairfield, Carroll, Lithopolis; Franklin, Briggsdale, Columbus, East Columbus; Guernsey, Cambridge; Hamilton, Blue Ash; Jackson, Wellston; Lake, Mentor, Painesville; Lorraine, Elyria; Lucas, Toledo; Mahoning, Youngstown; Medina, Medina, Wadsworth; Montgomery, Dayton; northern Ohio; Pike, Elm Grove; Portage, Randolph, Ravenna; Sandusky, Clyde; Shelby, Anna; southern Ohio; Stark, Canton, Waynesburg, Wilmot; Summit, Akron, Barberton; Washington, Marietta; Wayne, Rittman, Wooster; western Ohio; Wyandot, Upper Sandusky.

Oklahoma: Creek, Drumright; central Oklahoma; Dewey, Seiling; Oklahoma, Britton, Oklahoma City; Stephens, Duncan; all parts of Oklahoma.

Oregon: Benton; Corvallis; Douglas; Hood River; Jackson, Medford, Talent; Josephine, Grants Pass; Malheur, Ontario; Marion; Salem; Rogue River Valley; Umatilla, Fossil, Milton; Washington, Forest Grove; Willamette Valley.

Pennsylvania: Adams; Chester, Kennett Square; Lackawanna, Roaring Brook Township; Philadelphia, Philadelphia.

South Carolina: Allendale, Fairfax; Barnwell; Coastal Plains Section; central Plains Section; Darlington; Florence; Greenville, Piedmont; Lexington, Leesville; Marlboro; Orangeburg, Springfield; Richland, Columbia; Saluda, Batesburg; Sumter.

South Dakota: Throughout the entire State.

Tennessee: Davidson, Nashville, Woodbine; Fayette, Moscow; Lawrence, Appleton; Shelby, Memphis; general over the State.

Texas: Brazos, College Station; Calhoun, Port Lavaca; Cameron, Brownsville; Dallas, Dallas; Galveston, Dickinson; Hill, Hillsboro; Nueces, Robstown; Sutton, Sonora.

Utah: Box Elder, Brigham, Willard; Cache, Hyrum, Logan, Providence, Trenton; Davis, Bountiful, Centerville, Farmington; Emery, Castle Dale; Garfield, Cannonville; Grand, Moab; Iron; Salt Lake, Union; Salt Lake Valley; San Juan; Utah, Lindon, Pleasant Grove, Provo; Washington, Santa Clara; Weber, Ogden.

Vermont: No references to Vermont were found but E. A. McGregor has one locality on his distribution map for Tetranychus telarius L. (See U. S. Dept. Agr. Farmers' Bul. 831, p. 5, 1917, 1934.)

Virginia: Accomac, near Nelsonia, Onley; Arlington, Arlington; Augusta, Staunton; Campbell, Lynchburg; Eastern Shore district; Fairfax, Oakton; Nansemond, Whaleyville; Norfolk, Norfolk; Princess Anne; southeastern Virginia.

Washington: Chelan, Wenatchee; Grant, Marlin, Warden; King, Seattle; Mason, Shelton; northwestern Washington; Okanogan, Okanogan; Walla Walla; Whitman, Laclede; Yakima, Moxee City, Yakima.

West Virginia: Lewis, Weston; Monongalia, Morgantown.

Wisconsin: Dane, Madison; Jefferson, Waterloo; Lincoln, Gleason; Monroe, Warrens; southern Wisconsin; throughout the State.

Wyoming: Central part of the State.

Foreign Distribution

Canada: ALBERTA, Calgary, Calgary, West; Lethbridge, Barnwell, Coaldale, Lethbridge, New Dayton, Raymond, Taber; Macleod, Macleod, Pincher Creek; Medicine, Brooks, Medicine Hat, Strathmore; Peace River, Wembley; Red Deer, Olds; throughout Alberta. BRITISH COLUMBIA, Cariboo, Pouce Coupe; Fraser

Valley, Sardis; Kamloops, Salmon Arm; Nanaimo, Sidney; Okanagan Valley; Okanagan Centre; Sumas Prairie; Yale, Vernon. MANITOBA, Brandon; MacDonald Rossendale, Stockton, Wawanesa; Noepawa, Amaranth, Carberry, Douglas, Gladstone, Neepawa; Portage la Prairie, Portage la Prairie; Prairie Provinces; Saint Boniface, Winnipeg; Winnipegosis, Swan River, to the international boundary; widespread in Manitoba. NEW BRUNSWICK, Saint John River Valley. NOVA SCOTIA, Kings, Annapolis Valley. ONTARIO, Algoma, Sudbury; Essex, Leamington; Lincoln, Beamsville, Niagara, Stoney Creek, Vineland, Winona; Norfolk, Simcoe, Waterford; Port Arthur, Thunder Bay; Prescott, Fournier; Russell, Ottawa; Wentworth, Burlington. YORK, Toronto; widespread in Ontario north of Lake Huron and Lake Superior. QUEBEC, Wright, Aylmar. SASKATCHEWAN, Assiniboia, Estevan (district southwest of); Battlefords, Scott; Melfort, Melfort; Moose Jaw, Pitman; Prince Albert, Parkside; Qu'Appelle, Indian Head; Rosthern, Saskatoon; Swift Current, Swift Current; throughout Saskatchewan.

Central America: COSTA RICA, San Pedro de Montes de Oca. MEXICO; State of Morelos; district of Huautla; State of Yucatan.

South America: ARGENTINA. BRAZIL, Bahia; Pernambuca; Vicasia; Minas Geraes; Rio de Janeiro.

Europe: AUSTRIA, Vienna. BELGIUM. BULGARIA. CZECHOSLOVAKIA. DENMARK, Copenhagen. ENGLAND, Bedford, Sandy; Berks, Kingston, Baguize, Sonning, Twyford Buckingham, Amersham; Cambridge; Cheshire; Conway Valley; Cornwall, Penzance; Cumberland, Skelton, Warwick; Derby, Derby; Devon, Bere Alston, Dawlish, Elburton, Paignton, South Devon, Tavistock; Gloucester, Bristol, Cambridge, Cheltenham; Hampshire, Botley, Fareham, Petersfield; Hereford, Wellington; Huntingdon, Paxton; Kent, Beltring, Canterbury, Chiselhurst, Cooling, Dartford, Goudhurst, Herts, Knockholt, Maidstone; Malling, Marden, Priory Station, West Malling, West Peckham, Wye, Yalding; Lincoln, Middlesex, Hampton; Monmouth, Abergavenny, Blackwood, Chepstow, Dinham, Newport, South Monmouthshire, Usk; Northumberland, Blagdon Hall, Corbridge, Cumberland; Nottingham; Oxford, Stanton Harcourt; Shropshire, Bedstone, Cound, Ellesmere, Leaton, Shrewsbury; Somerset, Bath; Stafford, Burton-on-Trent, Standon; Surrey, Byfleet, Wisley; Sussex, Wadhurst; southeastern England; southern England; southwestern Provinces; Warwick, Alcester, Moreton; Wilts, Stourton; Worcester, Malvern, Pershore; York, Boston Spa, Bridlington, Bruntcliffe, Denholme, Ellerton, Goathland, Goole, Halifax, Leeds, North Cave, Nostell, Rawdon, Sheffield, Tadcaster, Wakefield, Wales. FINLAND. FRANCE, Alsace; Cote-d'Or; Mentone; Montpellier; Paris; southern France, Strasburg, Toulouse. GERMANY, Augstenberg; Saxony, Bautzen. HOLLAND, recorded constantly as a pest; Zeeland. HUNGARY. IRELAND. ITALY, Redmont; Salerno Prov.; Turin; all citrus sections. LATVIA. NORWAY, Christiana. POLAND. RUMANIA, Bessarabia. RUSSIA, Armenia, Nakhichevan; Astrakhan; Caucasus, Anapa district on the Black Sea; Taman Peninsula of the Kuban region; central Russia; Crimea; Kazanstan (south part); Leningrad region; Moscow; Orel; Tadzhikistan; Transcaucasia; Ukraine, Kharkov, Kherson, Odessa, Volhynia; Uzbekistan. SICILY, Catania Province; Messina Province; Palermo; district of South Agata di Militello. SPAIN, Ciudad Real; all of the citrus-growing sections. SWEDEN. WALES, Cardigan, Aberystwyth; Flint, St. Asaph; Glamorgan, Barry, Cardiff, Cardigan, Fonmon, Neath, Oxwich,

Pontardawe, Rhoose, Swansea; Merioneth; Pembroke, Dale. YUGOSLAVIA.

West Indies: Antigua Isl.; Bahama Isl.; Bermuda Isl.; Barbados Isl.; Cuba Isl.; Haiti Republic, Port au Prince, Cul-de-Sac; Jamaica Isl.; Nevis Isl.; Puerto Rico Isl., Bayamon; St. Lucia Isl.; St. Vincent Isl.; Trinidad Isl.; Virgin Isles, St. Croix.

Dutch East Indies: Java, Buitenzorg.

Indian Ocean: Mauritius; Reunion Isl.; Saint Denis.

Pacific Ocean: Hawaiian Isl.* the lower Pulehu section.

Australia: NEW SOUTH WALES, Sydney; QUEENSLAND; southeastern Australia; TASMANIA Launceston, Victoria.

Host Plants

Abutilon sp., Acacia sp., Acer dasycarpum, Acer rubrum, Acer saccharum, Adopogon dandelion, Aesculus hippocastanum, Aethionema sp., Agropyrum repens, Albizia sp., Allium cepa, Alnus sp., Alnus japonica, Althaea officinalis, Althaea rosea, Amaranthus blitoides, Amaranthus retroflexus, Ampelopsis quinquefolia, Amygdalus communis, Amygdalus persica, Amygdalus persica nectarina, Ananas sativus, Angelica sp., Arthionema sp., Antirrhinum sp., Apios tuberosa, Apium graveolens, Apocynum sibiricum, Aquilegia sp., Arachis hypogaea, Arctium lappa, Aristolochia siphon, Artemisia vulgaris, Arum sp., Asclepias syriaca, Asparagus plumosus, Aspidistra sp., Aster sp., Aucuba sp., Avena sativa, Azalea sp., Balsam, Bauhinia sp., Begonia sp., Berberis thunbergi, Berlandiera subacaulis, Beta cicla, Beta crassa, Beta vulgaris, Betula sp., Bouvardia sp., Brassica oleracea capitata, Brassica rapa, Buddleia sp., Buxus sp., Cactaceae, Calceolaria sp., Calonyction, Camellia japonica, Cannavalia sp., Cannabis sativa, Capsicum annuum, Carica papaya, Carphephorus corymbosus, Cedrus deodara, Cedrus sp., Celastrus sp., Celtis occidentalis, Chamaesyce buxifolia, Chayota edulis, Chenopodium album, Chenopodium ambrosioides, Chenopodium botrys, Chrysanthemum parthenium, Chrysanthemum sp., Cinchona sp., Cinnamomum camphora, Citrullus vulgaris, Citrus grandis, Citrus medic, Citrus nobilis, Citrus nobilis deliciosa, Citrus nobilis unshiu, Citrus sinensis, Clematis jackmani, Clematis sp., Clitoria sp., Cnicus benedictus, Codiaeum variegatum, Coffea arabica, Colocasia sp., Convallaria majalis, Convolvulus arvensis, Convolvulus sp., Corylus avellana, Cotoneaster sp., Crassula sp., Crataegus sp., Crotalaria purshii, Crotalaria rotundifolia, Cucumis melo, Cucumis sativus, Cucumis sp., Cucurbita maxima, Cucurbita pepo, Cuphea sp., Cupressus arizonicus, Cupressus sempervirens, Cupressus sp., Cyclamen sp., Cydonia oblonga, Cypripedium sp., Dactylis glomerata, Dahlia sp., Datura arborea, Datura metel, Datura stramonium, Datura suaveolens, Datura sp., Delphinium sp., Desmodium tortuosum, Dianthus carophyllus, Dicrilla sp., Digitalis purpurea, Disella hederacea, Dolichos spp., Dracaena sp., Elaeagnus pungens, Eriobotrya japonica, Erlangea moschatum, Eryngium aromaticum, Erythrina sp., Euonymus atropurpureus, Eupatorium compositifolium, Faba vulgaris, Ficus sp., Fragaria sp., Fraxinus americana, Fraxinus sp., Fuchsia spp., Gardenia sp., Geranium carolinianum, Geranium maculatum, Geranium sp., Gladiolus sp., Glechoma sp., Gnaphalium obtusifolium, Godetia sp., Gossypium hirsutum, Gossypium sp., Gramineae, Gymnocladus canadensis, Gymnocladus sp., Hardenbergia comptoniana, Hedera helix hort. var., Hedera helix, Helianthus annuus,



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Helianthus lenticularis, Heliotropium sp., Heracleum sp., Heterotheca subaxillaris
Hevea sp., Hibiscus esculentus, Hicoria pecan, Hoffmannia griesbregtii, Hordeum
vulgare, Humulus lupulus, Humulus sp., Hydrangea sp., Ipomoea batatas, Ipomoea
purpurea, Iris sp., Juglans nigra, Juglans regia, Juniperus excelsa, Juniperus sp.,
Juniperus virginiana, Laburnum sp., Lactuca sativa, Lactuca scariola, Lagerstroemia
indica, Lantana sp., Larix sp., Lathyrus odorata, Leonotis nepetaefolia, Ligustrum
amurense, Ligustrum sp., Lilium longiflorum, Linum sp., Lippia nodiflora, Lonicera
sp., Lupinus sp., Lycopersicum esculentum, Lycopersicum sp., Mnclura pomifera,
Malus sylvestris, Malva parviflora, Manettia sp., Mangifera indica, Manihot esculenta,
Medicago hispida, Medicago sativa, Melia sp., Mimulus moschatus, Mimulus
sp., Morus sp., Oenothera laciniata, Oenothera sp., Orthrosanthus sp., Passiflora
spp., Pastinaca sativa, Pelargonium sp., Persea gratissima, Persicaria lapathifolia,
Phaseolus acutifolius var. latifolius, Phaseolus lunatus macrocarpus, Phaseolus
multiflorus, Phaseolus spp., Phaseolus vulgaris, Phlox sp., Physalis angulata var.
linkine, Physalis edulis, Phytolacca americana, Picea canadensis albertiana, Picea
canadensis, Picea excelsa, Picea pungens, Picea pungens glauca, Picea sp., Pinus
banksiana, Pinus strobus, Piper sp., Picum sativum, Platanus sp., Polyanthus sp.,
Populus balsamifera, Populus candicans, Populus nigra italicica, Populus sp., Populus
tremuloides, Populus trifoliata, Primula sp., Prunus armeniaca, Prunus avium,
Prunus cerasus, Prunus domestica, Prunus spp., Pseudotsuga douglasii, Ptelea trifolia,
Fueraria thunbergiana, Pycnothymus rigidus, Pyracantha sp., Pyrus communis,
Quamoclit pinnata, Quercus alba, Quercus nigra, Quercus palustris, Quercus phellos,
Raphanus sativus, Reseda sp., Ribes grossularia, Ribes nigrum, Ribes rubrum, Ribes
vulgare, Ricinus communis, Robinia pseudacacia, Rosa indica, Rosa spp., Rubus
allegheniensis, Rubus occidentalis, Rubus strigosus, Rubus spp., Rudbeckia laciniata,
Rumex acetosella, Rumex sp., Salix babylonica, Salix lasiandra, Salix sp.,
Salvia sp., Sambucus sp., Sassafras sp., Scabiosa sp., Selenicereus sp., Sesbania
aegyptiaca, Sida rhombifolia, Sisymbrium officinalis, Smilax sp., Soja max, Solanum
gracilis, Solanum melongena, Solanum muricatum, Solanum sp., Solanum tuberosum,
Solidago sp., Sonchus arvensis, Sonchus asper, Sorbus sp., Spinacia olaracea,
Spiraea tomentosa, Stachys arvensis, Sterculia acerifolia, Syringa sp., Tagetes sp.,
Taraxacum sp., Taxus sp., Thea sp., Thuja orientalis, Thuja sp., Thunbergia sp.,
Thyransanthema semiflosculare, Tilia platyphyllos, Tradescantia fluminensis, Trifolium
incarnatum, Trifolium pratense, Triticum aestivum, Tropaeolum peregrinum,
Tropaeolum sp., Typha sp., Ulmus sp., Verbena sp., Vermonia sp., Veronica sp.,
Viburnum sp., Vicia angustifolia, Vicia faba, Vicia sativa, Vicia sp., Vicia
villosa, Vigna spp., Viguiera sp., Viola odorata, Viola spp., Viola tricolor,
Vitis spp., Weigela sp., Wisteria sp., Xanthium sp., Zantedeschia sp., Zea mays,
Zinnia sp.